**UCS 2312 Data Structures Lab**

**Assignment 6: Doubly linkedlist and its applications**

**Date of Assignment: 10.11.2022**

Create an ADT for the doubly linked list data structure with the following functions. Each node which consists of integer data, address of left and right nodes [CO1, K3]

Create a ListADT which has implementations for the following operations

1. Insert an item in the front of the list

void insertFront(listADT L, char c)

1. Insert an item at the end of the list

void insertEnd(listADT L, char c)

1. Insert an item ‘d’ after the first occurrence ‘c’ of the list

void insertMiddle(listADT L, char c, char d)

1. Display the items from the list

void displayItems(listADT L)

1. Delete the item present in the list

void deleteItem(listADT L, char c)

1. Search an element in the list and return the number of occurrences

int searchItem(listADT L, char c)

Create an application using the ListADT to do the following

1. Check whether the list is palindrome or not
2. Create separate lists containing vowels and consonants from the list
3. Swap kth node from the beginning with kth node from the end

Testcase:

Initially L is Empty

insertFront(L,’A’) 🡪 header🡨🡪A

insertEnd(L,’B’) 🡪 header🡨🡪A🡨🡪B

insertMiddle(L,’A’,’E’) 🡪 header🡨🡪A🡨🡪E🡨🡪B

insertMiddle(L,’A’,’E’) 🡪 header🡨🡪A🡨🡪 E🡨🡪E🡨🡪B

search(L,’E’) 🡪 2

1. Check whether the list is palindrome or not

Input: Header🡨🡪A🡨🡪C🡨🡪E🡨🡪K🡨🡪P🡨🡪I🡨🡪O🡨🡪U🡨🡪J

Output: Not a palindrome

Input: Header🡨🡪A🡨🡪P🡨🡪P🡨🡪A

Output: Palindrome

2. Create lists containing vowels and consonants

Input: Header🡨🡪A🡨🡪C🡨🡪E🡨🡪K🡨🡪P🡨🡪I🡨🡪O🡨🡪U🡨🡪J

Output:

Header1🡨🡪A🡨🡪E🡨🡪I🡨🡪O🡨🡪U

Header2🡨🡪C🡨🡪K🡨🡪P🡨🡪J